

## Table of Contents

**Corporate Authorization**  
**Acknowledgements**  
**Executive Summary**

<b>1.0</b>	<b>Introduction</b>	<b>1</b>
1.1	Background	1
1.2	Objective	1
1.3	Scope of Work	1
<b>2.0</b>	<b>Literature Review</b>	<b>2</b>
2.1	Hamlet of Clairmont – Water Distribution System, Sanitary Sewer System Review and Evaluation – GPEC Consulting Ltd., February 1997	2
2.2	Hamlet of Clairmont – Off-Site Levy Review – GPEC Consulting Ltd., September 2002	2
2.3	Clairmont Servicing and Planning Areas Study – County of Grande Prairie No. 1 – Infrastructure Systems Ltd., December 2002	2
2.4	Pre-Design Report – SW ¼ Section 27-72-6-W6M – Clairmont Sewage Treatment and Disposal Expansion – GPEC Consulting Ltd., October 2002	2
2.5	County of Grande Prairie No. 1 - Municipal Development Plan Bylaw No. 2360, January 2004	2
2.6	County of Grande Prairie No. 1 – City of Grande Prairie, Town of Sexsmith – Regional Water and Wastewater Systems – Infrastructure Systems Ltd. and Turnkey Management Consulting, July 2001	3
2.7	Levy Options for Oversizing and Lift Station – Clairmont – Beirsto-Stewart-Weir Engineering Limited, December 2001	3
2.8	Balisky-Hodges Area Structure Plan (N ½ Sec 2-72-6-W6M; S ½ 11-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnern Ketchum Engineering Ltd., March 2005	3
2.9	Althen Corner Area Structure Plan (N ½ Sec 11-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnern Ketchum Engineering Ltd., March 2004	3
2.10	Kehr-Althen Area Structure Plan (Sec 14-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnern Ketchum Engineering Ltd., March 2005	3
2.11	West Clairmont Area Structure Plan (Sec 23-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnern Ketchum Engineering Ltd., May 2004	4
2.12	Faul-Althen Area Structure Plan (N ½ Sec. 6, Sec 7-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnern Ketchum Engineering Ltd., July 2004	4
2.13	Crossroads South Phase 1 Area Structure Plan (Sec 12-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnern Ketchum Engineering Ltd., May, 2005	4
2.14	Crossroads South Phase 2 Area Structure Plan (Sec 7-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnern Ketchum Engineering Ltd., June, 2005	4

2.15	Crossroads North Area Structure Plan (Sec 13-72-6-W6M) – Infrastructure Systems Ltd. in association with Beirsto Lehnrs Ketchum Engineering Ltd., May, 2005	5
2.16	County of Grande Prairie No. 1 (Part of S1/2 Sec 24-6-72-W6M and Part of SW ¼ Sec 25-6-72-W6M)– Lakeside Area Structure Plan – Infrastructure Systems Ltd. in association with Beirsto Lehnrs Ketchum Engineering Ltd., August, 2004	5
2.17	Lakeside Area Structure Plan(SW 19-72-5-6, SE 24-72-6-6, Pt. SW 24-72-6-6 Lot 39, Plan 0023278, Pt. NE 24-72-6-6 and Road Allowances) - Infrastructure Systems Ltd. in association with Beirsto Lehnrs Ketchum Engineering Ltd., October 18, 2004	5
<b>3.0</b>	<b>Projected Growth and Land Use</b>	<b>6</b>
3.1	Land Use	6
3.2	Industrial and Commercial Growth	6
3.3	Residential Growth	8
<b>4.0</b>	<b>Design Criteria</b>	<b>10</b>
4.1	Introduction	10
4.2	Residential Development	10
4.3	Commercial Development	11
4.4	Industrial Development	12
4.5	Institutional Development	12
4.6	Peaking Factors	13
4.7	Fire Flow	13
4.8	Trickle Water System	13
<b>5.0</b>	<b>Clairmont Existing Water System</b>	<b>15</b>
<b>6.0</b>	<b>Water Model Development</b>	<b>16</b>
6.1	Data Sources and Assumptions	16
6.2	Existing Water System Water Demands	16
6.3	Water Model Calibration	16
<b>7.0</b>	<b>Existing System Improvements</b>	<b>18</b>
7.1	Existing Water Distribution System Deficiencies	18
7.2	Existing Water Distribution System Improvements	18
7.3	Reservoir Improvements	18
<b>8.0</b>	<b>Ultimate Servicing Options</b>	<b>20</b>
8.1	Introduction	20
8.2	Option 1	20
8.3	Option 2	22
8.4	Preferred Options	24
8.5	City of Grande Prairie Water Treatment Plant	24
<b>9.0</b>	<b>Regional System Improvements</b>	<b>26</b>
9.1	Zone 3 Reservoir Interim Water Supply	26
9.2	Regional Water Transmission Line Improvements	27
<b>10.0</b>	<b>Stage Implementation Plan</b>	<b>30</b>
10.1	Immediate Improvements in the Existing System	30
10.2	Staged Implementation	30
10.3	Summary of Staged Implementation Costs	31

<b>11.0</b>	<b>Benchmark Information</b>	<b>32</b>
11.1	Municipality of Wood Buffalo	33
11.2	Lakeland County	35
11.3	Yellowhead County	36
11.4	Red Deer County	37
11.5	Parkland County	40
11.6	Leduc County	43
<b>12.0</b>	<b>Funding Mechanism</b>	<b>45</b>
12.1	Government Grants	45
12.2	Infrastructure Charge Fees	47
<b>13.0</b>	<b>Best Practices Investigation</b>	<b>53</b>
13.1	Leading Utility Practices	53
13.2	Good Governance in Water Utilities	53
13.3	Reducing the Impact of Variations in Financial Plans	54
13.4	Adoption of a Strategic Planning Framework	55
13.5	Best Practices in Minimizing Water Loss	55
13.6	Creating a Water Smart Community	56
13.7	Lessons Learned from Walkerton	56
13.8	Strategies for Competitive Advantage	58
13.9	Best Practices for Maintenance Work Orders	59
<b>14.0</b>	<b>Conclusions</b>	<b>61</b>
<b>15.0</b>	<b>Recommendations</b>	<b>63</b>

### Appendices

Appendix A	Servicing Options Construction Cost Estimates
Appendix B	Levy and Cash Flow Projection

### List of Tables

Table 3.2.1	Clairmont Area Industrial Land Consumption Estimates	7
Table 3.3.1	Clairmont Area Population Growth Estimates	8
Table 4.1.1	Comparison of Water Distribution Standards for Various Alberta Municipalities	After Page 10
Table 4.2.1.1	Current Water Consumption	11
Table 4.3.2.1	Comparison of Wastewater Collection System Design Standards for Various Alberta Municipalities	After Page 12
Table 6.2.1	Clairmont Water Distribution Model Calibration Results	17
Table 7.3.1.1	Projected Water Demand	18
Table 7.3.2.2	Projected Average Day Water Consumption with Reduction	19
Table 7.3.3.3	Reservoir Capacities	19
Table 9.2.1	Full Buildout Maximum Day Demand (L/s)	29
Table 9.2.2	Growth Scenario Requirements for Various Options	After Page 29
Table 10.3.1	Estimated Implementation Costs for Cost Sharing for Various Growth Scenarios	31

**List of Figures**

Figure 1.1.1	Study Area Plan	After Page 1
Figure 3.1.1	Generalized Land Use	After Page 6
Figure 3.1.2	Growth Area Plan	After Page 6
Figure 3.2.1	Industrial Growth Contour	After Page 7
Figure 3.3.1	Residential Growth Contour	After Page 8
Figure 4.8.1	Trickle Water System	After Page 13
Figure 5.0.1	Existing Water Distribution System	After Page 15
Figure 7.1.1	Existing Water Distribution System Improvements	After Page 18
Figure 8.1	Potential Reservoir Location	After Page 20
Figure 8.2.1	Option 1A - Ultimate Water System	After Page 21
Figure 8.2.2	Option 1B - Ultimate Water System	After Page 21
Figure 8.3.1	Option 2A - Ultimate Water System	After Page 23
Figure 8.3.2	Option 2B - Ultimate Implementation	After Page 24
Figure 9.1.1	Zone 1 Flows	After Page 26
Figure 9.1.2	Zone 2 Flows	After Page 26
Figure 9.1.3	Zone 3 Flows	After Page 26
Figure 9.1.4	Proposed Alternative Designated Watermain to Zone 3	After Page 26
Figure 9.2.1	Existing 450 mm Transmission Line	After Page 29
Figure 9.2.2	Twinned Transmission Line	After Page 29
Figure 10.2.1	Option 2B - 5 Year Implementation Plan	After Page 30
Figure 10.2.2	Option 2B - 10 Year Implementation Plan	After Page 30
Figure 10.2.3	Option 2B - 20 Year Implementation Plan	After Page 30
Figure 10.2.4	Option 2B - Ultimate Implementation Plan	After Page 30